RMRS Rocky Mountain Remediation Services, L.L.C.

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RF/RMRS-97-021

Reconnaissance Level Characterization Report

For Building 123

JUNE 1997

RECONNAISSANCE LEVEL CHARACTERIZATION REPORT
FOR Building 123

REVISION 0

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RECONNAISSANCE LEVEL CHARACTERIZATION REPORT

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ACRONYMS

ACM	asbestos-containing material
ALARA	as low as reasonably achievable
Am	americium
Ba	barium
Be	beryllium
BTEX	benzene, toluene, ethylbenzene, and xylenes
CCR	Colorado Code of Regulations
CDPHE	Colorado Department of Public Health and the Environment
CERCLA	Comprehensive Environmental Response and Liability Act
CFR	Code of Federal Regulations
$C_2H_4O_2$	acetic acid
Cm	curium
DOE	Department of Energy
dpm	disintegrations per minute
DPP	Decommissioning Program Plan
ED	External Dosimetry
EDE	Effective Dose Equivalent
FIDLER	Field Instrument for the Detection of Low Energy Radioactivity
H^3	tritium
HASP	Health and Safety Plan
HCl	hydrochloric acid
$HCLO_4$	perchloric acid
HEPA	high-efficiency particulate air
HF	hydrofluoric acid
HNO_3	nitric acid
HPGe	high-purity germanium survey
HPI	Health Physics Instrumentation
HRR	Historical Release Report
H_2SO_4	hydrosulfuric acid
HVAC	heating, ventilating, and air conditioning
IEP	Idle Equipment Program
IH	Industrial Hygiene
IHSS	Individual Hazardous Substance Site
IPC	in-process characterization
IWCP	Industrial Work Control Plan
LLM	Low Level Mixed Waste
LLW	Low Level Waste
mrem	millirem
MARSSIM	Multi-Agency Radiological Site Survey and Site Investigation Manual
NaOH	sodium hydroxide
NH_4OH	ammonium hydroxide
Ni	nickel
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PAM	Proposed Action Memorandum
Pb	lead
PCB	polychlorinated biphenyl
PCE	tetrachloroethane
PPE	Personal Protective Equipment
Pu	plutonium
QA/QC	Quality Assurance/Quality Control

R&D	research and development
RAD	radiological
RCA	Radiologically Contaminated Area
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RLCR	Reconnaissance Level Characterization Report
RMMA	Radioactive Material Management Area
RMRS	Rocky Mountain Remediation Services
RPT	Radiological Protection Technologists
RWP	Radiation Work Permit
RMRS	Rocky Mountain Remediation Services
SAA	Satellite Accumulation Area
SAP	Sampling and Analysis Plan
Sr	strontium
TBC	to-be-considered
TFCM	trichlorofluoromethane
$TiCl_3$	titanium chloride
TLD	thermoluminescent dosimeter
TSCA	Toxic Substances Control Act
TSD	treatment storage disposal
U	uranium
VOC	volatile organic compounds
VSP	vertical soil profile
WSRIC	Waste Stream Residue Identification Characterization

RECONNAISSANCE LEVEL CHARACTERIZATION REPORT

1.0 INTRODUCTION

Due to the change in mission of the Rocky Flats Environmental Technology Site (RFETS) from the production of nuclear components to environmental cleanup and shutdown, Building 123 and its associated facilities have no identified mission after Fiscal Year 1997 Accordingly, Building 123 is being decommissioned to reduce RFETS operating costs and hazards

1.1 PURPOSE

The purpose of this Reconnaissance Level Characterization Report (RLCR) is to present a summary of the available historical data and process information relating to the Building 123 Cluster. Characterization includes identification of the type, quantity, condition, and location of both confirmed and potential sources of radioactive and hazardous substances within the subject area. The following facility information incorporates Building 123 project files and pertinent data from various sources. The report is to serve as a practical reference during the decontamination and decommissioning efforts

This project will facilitate the decommissioning of Buildings 123, 113, 114, and 123S; remediation of Individual Hazardous Substance Sites (IHSSs) 121 and 148; partial closure of Resource Conservation and Recovery Act (RCRA) Unit 40; and decontamination of radiologically-contaminated facility systems The Building 123 slab and foundation will be removed as required to remediate any subsurface contamination as dictated by soil sampling results

1.2 SCOPE

The information presented in this report supports the task defined in the Proposed Action Memorandum (PAM) for the Department of Energy (DOE) and pertains only to Building 123 and associated facilities The review of historical records and the collection of process knowledge information details the operational history from original building construction to present.

1.3 METHODOLOGY

The general methodology employed for the preparation of this report involved the identification, location, collection, and review of available Building 123 records The information sources examined in the course of this effort are listed in Section 5 0.

Collection of process information included interviews with RFETS employees whom had first-hand process knowledge of Building 123 operations The individuals are identified in the project files

Comprehensive physical inspections of all accessible areas of Building 123 were conducted during the months of April and May 1997 and will continue as decommissioning progresses. The primary objectives of the inspections are

- To confirm the accuracy of file documentation pertaining to as-built or modified facility construction equipment installations and general facility conditions Physical hazards are addressed in the Building 123 project specific Health and Safety Plan (HASP).
- To confirm and improve the accuracy of current facility inventory records of radioactive materials, special nuclear materials, hazardous materials, facility-related equipment, and to obtain volume estimates for wastes which will be generated during decommissioning activities

- To locate, identify, and document any facility condition or problem situation which had not been previously identified or otherwise documented in building records or files

- To identify equipment, structures, process lines, and associated items which will require field surveys and/or analytical sampling for the purposes of further characterization of the Building 123 facilities. Sampling activities will be conducted prior to decommissioning efforts Routine and decommissioning effectiveness surveys as part of an In-Process Characterization (IPC) will be conducted throughout the decommissioning process.

A summary of conditions within each area of Building 123 is provided in Appendix A Appendix A also identifies surveys or sampling required as a part of the IPC effort

1.4 SUMMARY

A detailed examination of process knowledge and documents, relating to Building 123 was initiated in April 1997. As part of this examination, a comprehensive survey of historical records was undertaken to determine the location and character of any radioactive and hazardous contaminants present in the area. A room by room compilation of relevant process knowledge and characterization information is presented in Section 4.0. The general conclusions drawn from this examination are as follows:

Presently, Building 123 is in a fully operational condition. All required utility services (i.e., electrical service, water supply, and natural gas supply) are active. Building air ventilation and High Efficiency Particulate Air-(HEPA) filtered exhaust systems, instrument air supply compressors, and necessary radiological monitoring instrumentation systems are in normal continuous operation. All manually-actuated and automated fire/alarm suppression systems are operational All installed facility security and radiological alarm systems are normal All remote-handling mechanisms and auxiliary facility support equipment are operational or are available for activation and use

Building 123 presently houses a small inventory of materials and equipment which are radioactive, radioactively-contaminated, and/or contain hazardous substances

Equipment which was thought to contain hazardous substances were put in the Idle Equipment Program (IEP) This ensured that the equipment fluids would be tested for the presence of hazardous substances. Equipment fluids found to contain a hazardous substance were removed during deactivation Due to the age of the facility, considerable amounts of asbestos are present in the insulation and building materials Lead is present in the vault shielding and in some of the building materials.

1.5 CONCLUSIONS

Based on review of the available information, it was determined that limited additional sampling and radiation surveys would need to be conducted prior to completing this Reconnaissance Level Characterization Report. The following decisions/observations were made from the Reconnaissance Characterization data and additional sampling which was conducted in the April to June 1997 time frame. Table 1-1 "Summary of B123 Characterization" presents a brief overview of the results for each room:

1.5.1 Radiological Surveys

Historical reports indicate that there are no areas within Building 123 which have significant amounts of unidentified/uncontrolled/unmarked radioactive contamination. There are some areas which are clearly identified as contamination areas As equipment is removed from Building 123 facilities, sampling and analysis for fixed radiation contamination will be completed Current planning is to decontaminate all rooms which handled significant quantities of radioactive material Preliminary Scoping Surveys of all laboratories and RMMAs/RCAs were conducted during the

month of June 1997 Fixed contamination was found in Rooms 105, 109, 126B and 157 as a result of the scoping surveys. Further evaluation of these rooms will be conducted to identify radioactive isotopes that are present

1.5.2 Hazardous Chemicals Evaluation

Although there were hazardous chemicals used in Building 123 facilities, all excess and hazardous chemicals have been inventoried and are scheduled to be removed from Building 123 facilities during the deactivation process. Should a chemical be found during the decommissioning process, the chemical will be handled in accordance with existing chemical identification and handling procedures. Areas such as the perchloric acid hoods will be smeared with pH paper to identify acid residues which may exist to be decontaminated

1.5.3 Asbestos Inspections

The specific quantity and distribution of asbestos containing material (ACM) has been estimated based on two(2) current asbestos building inspections which are documented in the following reports

Asbestos Inspection and Operations and Maintenance Plan for Building 123 Department of Energy Project No. 108230, December 31, 1996.

Asbestos Characterization Report· Addendum to Building 123 Inspection: SEG,CO Rev. 0 April 29,1997

Walkdowns conducted in April 1997 revealed that there is asbestos in some insulation material, and potentially in some ceiling tiles, floor tiles, mastic and wall board compound Much of the insulation material has been wrapped in place to prevent the asbestos from being disturbed. The other areas which have a potential for containing asbestos are in good condition Further sampling and asbestos abatement will precede any activity which would disturb the potential asbestos containing material.

1.5.4 Lead Paint Inspection and Sampling

A complete lead inspection and sampling event of Building 123 was conducted in April 1997 and is documented in the report titled *Lead Characterization Report for Building 123*, Rev 0 May 1,1997 The analysis of paints included total lead, chromium, cadmium and arsenic. A total of 21 paint samples were collected from the building Results indicated that 20 of 21 samples demonstrated detectable levels of lead Although questions have been raised regarding waste disposal practices, computer modeling and leachability studies have demonstrated that lead in paint, if it exists, will not create a landfill disposal problem

1.5.5 Beryllium Sampling

Beryllium metal was removed from Building 123 facilities during the deactivation process Historically, Be was handled in Rooms 111 and 112 Sampling activities for Be were conducted in the building in February and again in June of 1997 The results of the sampling effort demonstrated that all results recorded were well below the RFETS site housekeeping level of 25 ug/ft^2. Three swipes taken showed trace results (37 to 2.04 ug/ft^2) in Rooms 123A, 111, and 112 The first decommissioning effort in these rooms will be to wipe down and thoroughly clean all surfaces This effort is to remove any dust on equipment which may contain lead(Pb) or Be

1.5.6 PCB Evaluation

A walkdown of Building 123 was conducted on June 16,1997 to assess the presence of PCB items in the building The only suspect items identified include light ballasts and gasket materials associated with the HVAC system for the building Building 123 fluorescent lights and light ballasts will be removed and disposed in accordance with appropriate RFETS procedures Gasket materials will be assessed at the time of their removal and managed as waste as necessary

The B123 Cluster Decommissioning Project Specific HASP contains information on how the above information will be implemented as the decommissioning effort is completed

TABLE 1-1 SUMMARY OF B123 CHARACTERIZATION

W = Wall Board
T = Tile (Floor)
P = Pipe Insulation

Y = Yes, Detectable
N = Not Detected
N = Not Suspect

Room Number	Asbestos >1%	Be ug/ft²	Lead Paint ppm	Rad. Cont.	Acids Used	Misc.
100 West Entry	W/T/P	NS	Y	N	N	
101 Office	W/T/P	NS	Y	N	N	
101A Office	W/T/P	NS	Y	N	N	
102 Office	W/T/P	NS	Y	N	N	
102A Office	W/T/P	NS	Y	N	N	
103 Reagent Lab	W/T/P	N	Y	N	N	RCRA ck. pts
103A Special Bioassay	W/T/P	N	Y	N	Y	RCA/RMMA
105 Spike & Electroplating Prep	W/T/P	NS	Y	Y	Y	RCRA/RMMA
106 Office	W/T/P	NS	Y	N	N	
107 Office	W/T/P	N	Y	N	N	
107A Office	W/T/P	NS	Y	N	N	
109 Office	N	N	Y	Y	N	CS 137
109A Storage	W/T	N	Y	N	N	CS 137
109B Storage	W/T	N	Y	N	N	CS 137
109C Storage	W/T	NS	Y	N	N	RCA/RMMA
111 Beryllium & Bacteriology	W/P	2 04	Y	N	Y	
112 Environmental Soil Lab	W/P	55	Y	N	Y	RCA
113 Men's Restroom	P	NS	2700	N	N	
113A Janitor's Storage	P	NS	Y	N	N	
113B Men's Locker Room	P	NS	90	N	N	
115 Office	P	NS	4000	N	N	
121 Hallway near 103 & 133	W/P	N	Y	N	N	
121A Office	N	NS	Y	N	N	
122 Office	W/P	N	Y	N	N	
123 HPI Lab	W/P	NS	Y	N	N	RCA/RMMA
123A Hall to Exit Lockers	P	37	Y	N	N	
124 Electroplating Lab	W/P	NS	Y	N	N	RCRA
125 Radioactive Spikes	W/P	NS	750	N	Y	
126 Gas Chromatograph	W/P	N	Y	N	N	RCA

Room Number	Asbestos >1%	Be ug/ft²	Lead Paint ppm	Rad. Cont.	Acids Used	Misc.
126A Office	[illegible]	NS	[illegible]	N	N	
126B Office	[illegible]	NS	[illegible]	[illegible]	N	
126C Office	[illegible]	NS	[illegible]	N	N	
127 Bioassay	[illegible]	NS	[illegible]	N	[illegible]	RCA/RMMA
128 Office	[illegible]	NS	[illegible]	N	N	RCA/RMMA
129 Office	N	NS	[illegible]	N	N	
131 Electronics Lab	[illegible]	N	[illegible]	N	N	
131C Office	[illegible]	NS	2300	N	N	
132 East Utility Room	[illegible]	N	[illegible]	N	N	
133 External Dosimetry	[illegible]	NS	[illegible]	N	N	
133A Office	[illegible]	NS	[illegible]	N	N	
133B Office	[illegible]	NS	[illegible]	N	N	
133C Office	[illegible]	NS	[illegible]	N	N	
135 Alpha Spec & Liquid Scint Lab	[illegible]	NS	[illegible]	N	N	RCA Tritium & C-14
137 Small Room at Truck Dock	N	NS	[illegible]	N	N	
138 Office	N	NS	[illegible]	N	N	
139 SE Entry Airlock	[illegible]	NS	[illegible]	N	N	
140 Hallway near 140A	[illegible]	NS	[illegible]	N	N	
140A Office	[illegible]	NS	10	N	N	
141 Office	[illegible]	NS	[illegible]	N	N	
142 Office	[illegible]	NS	[illegible]	N	N	
143 Office	[illegible]	NS	[illegible]	N	N	
143A Office	[illegible]	NS	[illegible]	N	N	
144 Office	[illegible]	NS	[illegible]	N	N	
146 Office	[illegible]	NS	[illegible]	N	N	
147 Office	[illegible]	NS	[illegible]	N	N	RCA, lead bricks
150 Office	[illegible]	NS	180	N	N	
151 Office	[illegible]	NS	[illegible]	N	N	
154 SW Entry Vestibule	[illegible]	NS	[illegible]	N	N	

Room Number	Asbestos >1%	Be ug/ft²	Lead Paint ppm	Rad. Cont.	Acids Used	Misc.
155 Office	[illegible]	N	830	N	N	
155A TLD Irradiator	N	NS	[illegible]	N	N	Sealed Gamma Source
156 Use of Radioactive Spikes, etc	[illegible]	NS	[illegible]	N	[illegible]	
157 Environmental Sample Prep Lab	[illegible]	N	120	[illegible]	[illegible]	RCA, RCRA
158 Sample Receiving Station	[illegible]	N	270	N	N	RCA
159 West Utility Room	[illegible]	N	[illegible]	N	N	
160 Office	[illegible]	NS	[illegible]	N	N	
161 Office	[illegible]	NS	7300	N	N	
162 Office	[illegible]	NS	[illegible]	N	N	
162A Office	[illegible]	NS	[illegible]	N	N	
162B Office	[illegible]	N	[illegible]	N	N	
163 Air Sample Counting Room	[illegible]	N	[illegible]	N	N	RCA/RRMA
164 Hallway in front of 163	[illegible]	NS	[illegible]	N	N	
165 Computer Room (SE corner)	[illegible]	NS	10	N	N	

2.0 BUILDING 123 PHYSICAL DESCRIPTION

2.1 SUMMARY DESCRIPTION OF THE BUILDING 123 CLUSTER

The main structure in the Building 123 Cluster (Figure 2-1) is Building 123, a bioassay laboratory and a dosimetry counting and distribution facility Associated structures include Building 113, a medical records storage facility (which originally served as a guard shack), Building 114, a small outdoor shelter; and Building 123S, a metal storage unit for containerized waste. Building locations are indicated in Figure 2-2. This section describes the physical arrangement of principal buildings in the Building 123 Area, including architectural and structural features, significant equipment, environmental control systems and safety aspects of each building

Building 123 is located on Central Avenue between Fourth and Fifth Streets (Figure 2-1). Figure 2-2 indicates the location of the building relative to other RFETS facilities. The original Building has been in use since its original construction in 1953, with additions completed in 1968, 1972, and 1974 The general areas of the building and approximate construction dates are

East and North Wing (Rooms 100-135) - 1952
Addition to East Wing (Rooms 139-151) - 1968
West Wing (Rooms 154-163) - 1972
Addition to East Wing (Room 165) - 1974

Currently, the facility covers approximately 19,000 square feet and is a single level building constructed on grade with approximately 14 foot ceilings Construction material is mostly concrete with a built-up asphalt roof. Modifications have been made to the building interior after the original construction of each area Areas have been remodeled including installation and removal and partition walls, laboratory fixtures and other items Sections of piping have been installed, removed and modified during the life of the facility In addition, piping insulation in some areas has been replaced Therefore, the possibility exists for a specific system, room or area to contain both asbestos containing materials (ACM) and non-ACM

Heating, ventilating, and air conditioning (HVAC), electricity, gas and compressed air, steam, water, process waste, sewer; fuel oil, and fire protection utility systems serve the building

2.2 SPECIFIC DESCRIPTION OF THE BUILDING 123 CLUSTER

2.2.1 Foundations

Foundations for Buildings 123 and 113 are horizontal, poured-in-place, reinforced concrete-spread footings that vary in depth from 3 feet to 9 feet below grade Reinforced concrete grade beams, 16 inches to 18 inches wide and 10 inches to 13 inches thick, rest on the spread footings Concrete grade walls 10 1/2 inches to 12 inches thick and 4 feet. 6 inches deep support the exterior walls. Foundations for Building 123S and 114 consist of horizontal, poured-in-place, reinforced concrete slabs on grade

2.2.2 Structural Framing

Framing members used in Buildings 123 and 113 include columns constructed of metal beams resting on slab footings and supporting corrugated walls and ceilings. The majority of the beams are painted with industrial epoxy paint The structural framing in Building 123S consists of steel I-beams resting on a reinforced concrete slab on grade Building 114 is constructed of concrete blocks resting on reinforced concrete slab on grade.

2.2.3 Exterior Walls

Exterior walls of Buildings 123 and 114 are made of concrete blocks The walls are not insulated. Outer surface of the concrete walls are painted Exterior walls of Building 123S are composed of sheet metal. The walls are not insulated The outer surface of the sheet metal walls are painted. Exterior walls of Building 113 are composed of stucco rock and concrete over concrete block walls The walls are not insulated.

2.2.4 Floors

The floor slabs in Building 123, 123S, 113 and 114 are poured-in-place, reinforced concrete 6 to 8 inches thick, with a barrier on a gravel base.

2.2.5 Roofs

The Building 123 roof is a built-up membrane, constructed of corrugated sheet metal and tar. Building 123S is constructed with sheet metal Buildings 113 and 114 are built-up membranes, constructed of corrugated sheet metal, tar and pea gravel

2.2.6 Interior Walls

Most interior walls in Building 123 are corrugated metal, concrete (shared walls with exterior walls) and cementitious board. Some hallways and offices have 1/2 inch chalk pressboard over concrete and/or corrugated metal walls The interior walls are not insulated Four interior/exterior walls (1/4 inch maximum thickness) in Building 123S are constructed of sheet metal and are not insulated Interior walls in Building 114 consist of non-insulated concrete blocks Building 113 has cementitious board over concrete walls The walls in Building 113 are not insulated

FIGURE 2-1 - Building 123 Area Location

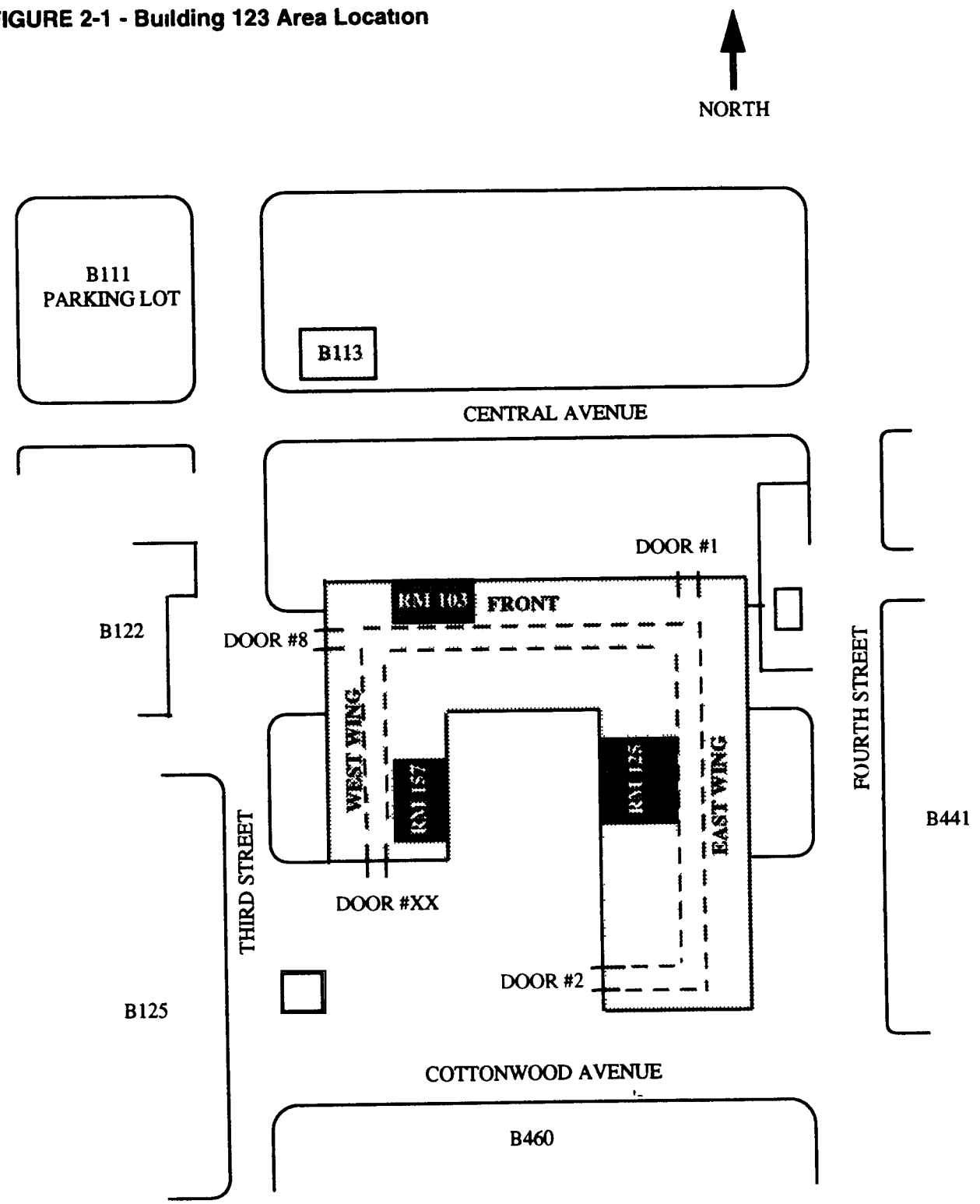
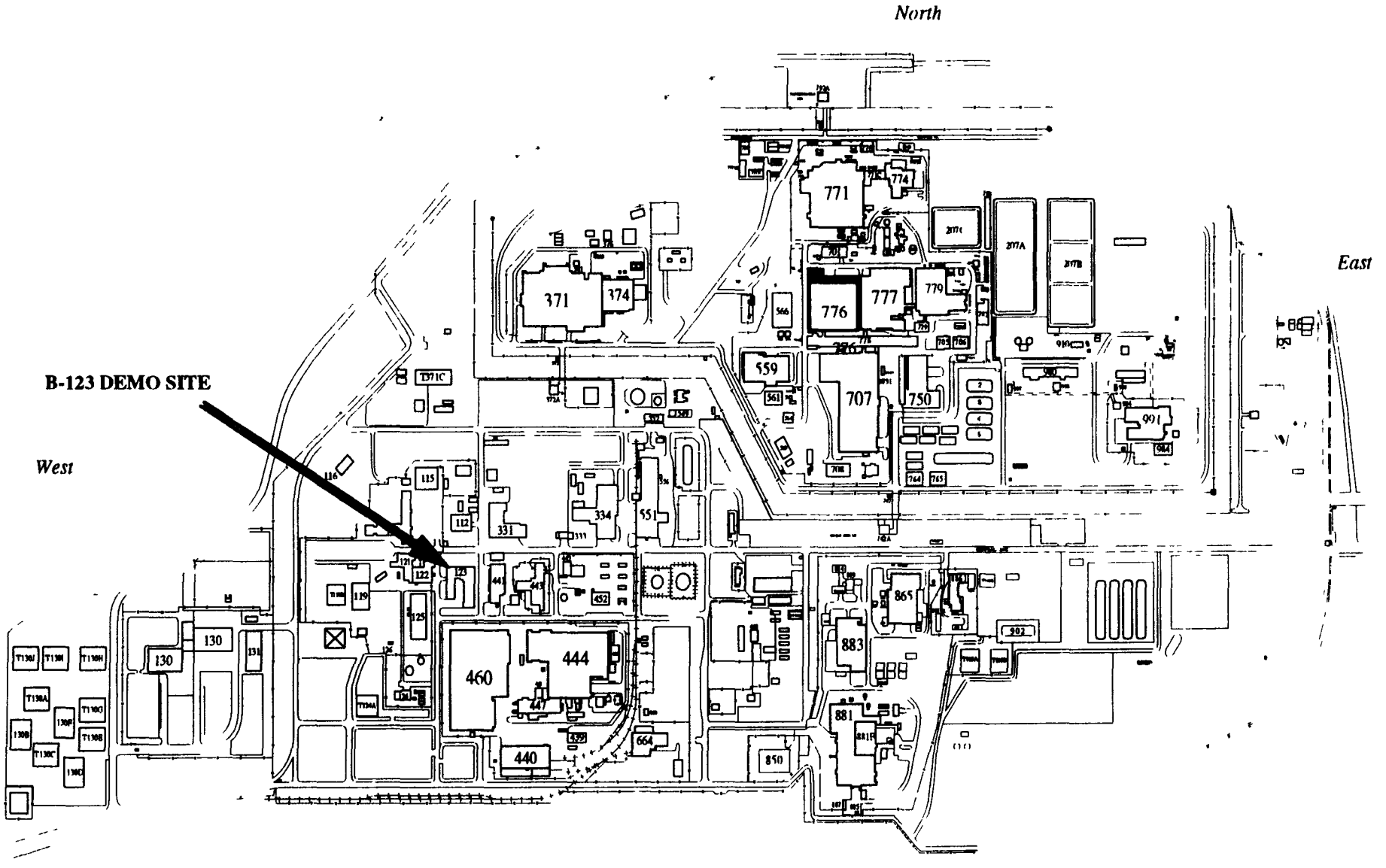


FIGURE 2-2 - Building 123 Area Map



2.2.7 Ceilings

Ceilings in offices and hallways in Buildings 123 and 113 are comprised of suspended acoustical tile Ceilings in Buildings 123S and 114 are constructed of sheet metal

2.2.8 Doors

Most of the personnel doors in Building 123 are either solid steel, steel with louvers, or steel with safety glass windows Building 123S consists of two steel doors Buildings 113 and 114 consist of two steel doors with safety glass windows All doors in Buildings 123, 123S, 113 and 114 are enclosed in an aluminum frame

2.2.9 Windows

There are approximately 90 exterior windows in Building 123 Building 123S does not have windows Building 114 has four windows Building 113 has four windows (each approximately 3 X 12 feet). All exterior windows in Buildings 123, 123S, 113 and 114 are enclosed in an aluminum frame.

2.2.10 Surface Finishes

Most interior and exterior walls in Buildings 123, 123S, 113 and 114 are painted Floors in Buildings 123S and 114 are unpainted concrete Building 113 has carpet over unpainted concrete Most hallways in Building 123 consist of asbestos tile over concrete Approximately seventeen (17) labs consist of asbestos tile over concrete, twenty-seven (27) offices with carpet over tiles and twenty-three (23) offices with asbestos tile over concrete

3.0 GENERAL OPERATING HISTORY

3.1 Operating History of Buildings 123, 113, 114, and 123S

3.1.1 Building 123

Building 123 was one of the first ten (10) buildings constructed at Rocky Flats Analytical laboratory, dosimetry and instrument calibration activities have been conducted in Building 123 since construction of the building in 1953 Building 123 also provides office space for radiation health specialists, storage for all radiological health records, a laboratory for calibration and repair of criticality alarms and other repair/calibration shops Building 123 once housed medical research until such operations were relocated to Building 122

The operation of the analytical laboratory generates approximately 95 percent of the building waste and stores the majority of hazardous chemicals, with minor contributions from the External Dosimetry (ED) and Health Physics Instrumentation (HPI) Sections Standard utility services have also generated small amounts of waste in the past

The analytical laboratory analyzes environmental (air, water, soil, and vegetation), biological (urine, fecal material, and nose swipes), health physics (room air), and industrial hygiene samples (Be and organic vapors in room air), while the HPI Section repairs and calibrates radiation-detection instruments The ED Section processes thermoluminescent dosimeters (TLDs) and film badges The Radiological Records Section maintains occupational radiation exposure and dose records for radiation workers

The analytical laboratory procedures involve digesting samples to purify and concentrate the radiological constituents Sample preparation operations generated the bulk of the building waste. Combustibles, rubber gloves, and broken glass generated in the Radioactive Materials Management Areas (RMMAs) were placed in accumulation areas for eventual handling and removal as low-level waste Some sample waste and rinse solutions were washed down the process drain for subsequent treatment in Building 774 (in Building 374 after 1983) Liquid organic wastes were placed in special bottles and stored in satellite accumulation areas prior to transfer to the RCRA 90-day storage building and eventual shipment to Liquid Waste Operations. RCRA wastes were also collected in Satellite Accumulation Areas (SAAs), located in rooms 103A, 124, 125, 127, and 156 Wastes generated in non-RMMAs and monitorable lab trash were deposited in dumpsters for disposal in the RFETS landfill

Hazardous chemicals associated with Building 123 operations included nitric acid, hydrochloric acid, hydrofluoric acid, oxalic acid, ammonium hydroxide, formic acid, perchloric acid, toluene, isopropyl alcohol, ammonium thiocyanate, methanol, mercury, lead, cadmium, beryllium, sodium hydroxide, and potassium permanganate

During the past forty-four (44) years, building operations have resulted in varying degrees of radioactive and chemical contamination within the building For example, interviews with Building 123 occupants indicate that in the late 1960's or early 1970's, a liquid containing cesium was spilled on the concrete floor in Room 109C The floor was sealed to immobilize the contamination Also, leaks or spills have potentially contaminated the soil adjacent to and beneath the building (see Section 3 2 3)

3.1.2 Building 113

Building 113 is a guardhouse that has been converted to office space (see Figure 2-2) Constructed of concrete with a flat roof, the building is similar to four other guardhouses that have already been removed from RFETS No internal processes were located in this building. A Reconnaissance Level Characterization Survey of this building focused on bulletproof glass in the windows and the potential for lead-based paint on the blinds No asbestos could be identified in the survey However, potential exists for the presence of PCBs in the light ballasts

3.1.3 Building 114

Building 114 is a small shelter used by RFETS employees as a waiting area for offsite transportation The building encloses about 25 square feet It is constructed of masonry blocks with a flat roof There are no utilities associated with this building, and records indicate that the building has served no other function

3.1.4 Building 123S

Building 123S is a metal shed on a concrete slab The shed encloses approximately 60 square feet It was formerly used as a RCRA 90-day storage area by laboratories in Building 123 Organic wastes such as toluene and DDCP were stored there The facility has been closed for approximately one (1) year No waste or other material is currently stored in the shed No utility hookups exist in the building A visual inspection of the shed did not reveal any hazards associated with the structure

3.2 RCRA and Comprehensive Environmental Response and Liability Act-(CERCLA) Designated Areas

3.2.1 RCRA Unit 40

The Building 123 area encompasses a portion of RCRA Unit 40, the plant-wide process waste system, a network of tanks and underground and overhead pipelines constructed to transport and temporarily store process wastes from point of origin to on-site treatment and discharge points RCRA Unit 40 includes all overhead and underground and process waste lines in and around Building 123 Sections of Original Process Waste Lines (OPWLs) were replaced prior to 1975 by either overhead lines or double-contained sections. Abandonment was documented by completed engineering drawings. In 1989 the process waste transfer system was upgraded Sections of the overhead waste system were removed and replaced or converted to the new system. Contamination was not detected in any of the removed sections, and thus the sections were disposed at a sanitary landfill.

3.2.2 IHSS 121

The Building 123 area includes CERCLA-designated IHSS 121 IHSS 121 consists of RCRA Unit 40 underground Original Process Waste Lines (OPWLs) P-1, P-2, and P-3 The lines transferred the following process waste from Building 123.

- Acids, nitric acid (HNO_3), hydrofluoric acid (HF), sulfuric acid (H_2SO_4), hydrochloric acid (HCl), acetic acid ($C_2H_4O_2$), and perchloric acid ($HClO_4$)
- Bases, ammonium hydroxide (NH_4OH) and sodium hydroxide (NaOH),
- Solvents, acetone, alcohols, cyclohexane, toluene, xylenes, trisooctomine, and ether,
- Radionuclides, various isotopes of plutonium (Pu), americium (Am), uranium (U), and curium (Cm),
- Metals, beryllium (Be) (trace amounts), and
- Others, ammonium thiocyanate, ethylene glycol, and possible trace amounts of polychlorinated biphenyls (PCBs)

3 2 2 1 OPWL P-1

Line P-1 was installed in 1968 and abandoned in June 1982 P-1 consists of a 3-inch polyethylene pipe inside a 4-inch steel pipe Total length has been reported as 180 feet and 120 feet, with outside lengths of 89 feet and 120 feet Line P-1 exits the south side of the west wing of Building 123 and extends east along the south side of the building.

Two manholes associated with P-1 were investigated in March 1994 The first manhole, located south of the west wing of Building 123, contains a north-south pipeline that appeared to be an active transfer line. The pipeline is approximately 5 feet below ground surface. The second manhole, associated with P-1 and P-2, is located south of the east wing of Building 123, and is approximately 5 feet deep Pipes enter the manhole from the north, south, and east All have been terminated and filled with concrete. According to current utility layout plans, a portion of the P-1 line exiting south of the west wing of Building 123 has been converted to the new process waste system

The 1986 OPWL Closure Plan indicated that no reportable releases have occurred at P-1 However, the entire pipeline was identified on a location map in the 1988 Closure Plan as an area of reported release

3222 OPWL P-2

Line P-2 was installed in approximately 1952 or 1953 and decontaminated, removed, and replaced with inspectable pipe in June 1982. P-2 consists of a 4-inch cast iron pipe. Total length has been reported as 452 feet, with outside lengths of 92 feet and 158 feet P-2 exits the south end of the east wing of Building 123, and connects to P-1 and P-3 at the southeast corner of the wing Records indicate that the pipeline has undergone at least two modifications A utility layout drawing indicates that Building 123 and pipes P-2 and P-3 have been extended south

Reports indicate releases from P-2 beneath Building 123, and the entire pipeline has been identified on the location map as an area of reported release.

3223 OPWL P-3

Line P-3 was installed in 1952 and was decontaminated, removed, and replaced with inspectable pipe in June 1982. P-3 consists of a 4-inch vitrified clay pipe with a total length of 162 feet. P-3 exits the manhole southeast of the east wing of Building 123 and connects with OPWL Tank T-2 in Building 441.

No known releases from P-3 have been recorded However, the entire pipeline was identified on a location map in the 1988 Closure Plan as an area of reported release

3.2.3 IHSS 148

IHSS 148 is part of Operable Unit No 13 (OU13) and is located beneath Building 123 IHSS 148 was established as a result of reported small spills of nitrate-bearing wastes along the east side of the building Leaks in the process waste line may have contributed to potentially-contaminated soil beneath the building A detailed characterization was conducted from September 1993 to February 1995 as part of a Phase I RCRA Facility Investigation/Remedial Investigation (RFI/RI) The characterization included high-purity germanium (HPGe) surveys, vertical soil profiles, surface soil sampling and soil gas surveys

Thirty-four analytes were detected in the surface soil survey, including 26 inorganic compounds and eight radionuclides

The soil-gas survey was conducted on a 25-foot grid in accordance with the OU13 RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan. Sixty-four (64) soil-gas locations were sampled during the survey 13 samples contained volatile organic compound (VOC) levels in excess of the 1 µg/L method detection limit Benzene, toluene, ethylbenzene, and xylene (BTEX) fuel constituents were detected in samples collected from the perimeter of Building 123 and within the west and east wings of the building Trichlorofluoromethane (TCFM) was detected in nine samples distributed throughout the IHSS 148 area at levels up to 2 6 µg/L. Tetrachloroethane (PCE) was detected at 1 5 µg/ L in a sample collected to the east of Building 123 The presence of organic extraction constituents is consistent with unconfirmed reports that such liquids used in radionuclide analyses were occasionally disposed onto the soil surface outside of Building 123 and allowed to evaporate Analyses results indicate that subsurface infiltration precluded full evaporation

3.3 IDENTIFIED BUILDING HAZARDS

The Reconnaissance Level Characterization survey identified no significant hazards associated with Buildings 123S, 113 and 114. Therefore, this discussion focuses on Building 123 Building 123 has approximately 75 rooms or areas which are utilized as laboratories, dosimetry areas, calibration areas, storage for records and equipment, and office space. Potential hazards in the building are summarized in Appendix A. These hazards were identified by a review of the facility's documents and a walkdown of the building by project personnel, assisted by building personnel knowledgeable of the facility's past.

Most of the potential hazards identified during the reconnaissance level characterization survey will be removed or eliminated during the preparatory activities prior to this project.

1. All ACM will be removed by a separate licensed contractor prior to building decommissioning

2 The fluorescent light ballast will be inspected for PCBs prior to building decommissioning Should the ballasts contain regulated levels of PCBs, they will be removed by the decommissioning contractor and packaged and shipped to a TCSA-regulated disposal facility by RMRS Waste Management

3 The liquid nitrogen system will be deactivated and the pressurized cylinders removed at the time the building tenants are relocated

4 Laboratory chemicals will be removed when the building tenants are relocated

5 Any material left in the building after the tenants depart will be addressed as part of this project

6 Once the buildings are ready for decommissioning, utilities and facility safety systems will be disconnected by Site Power and Maintenance

3.3.1 Asbestos

Asbestos Containing Materials (ACM) were inspected by a State certified inspector the week of April 7, 1997 This inspection is documented in Asbestos Characterization Report Addendum to Building 123 Inspection (April 1997) The inspection and evaluation was conducted in accordance with the guidelines specified in Asbestos Hazard Emergency Response Act (AHERA) and in compliance with the US Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and the State of Colorado regulations covering asbestos inspections Abatement will be conducted by a contracted State qualified abatement company

The following ACM sources and approximate volumes will be abated prior to the initiation of decommissioning Thermal System Insulation (900 linear feet), Cementitious Wall Board (3,450 square feet), Drywall with tape and compound (4,000 square feet), Resilient Flooring (10,600 square feet), Gray Paper Duct Insulation (100 square feet), and Mastic under Counter (40 square feet) Building 123 Asbestos Characterization Report, a subpart of the building's Reconnaissance Characterization Report, documents this complete process

3.3.2 Beryllium

Two laboratories, Rooms 111 and 112, processed beryllium contaminated samples as part of environmental soil sampling tests These areas were sampled (39 samples taken) by qualified beryllium sampling technicians and sent to an external analytical laboratory for analysis No samples identified the presence of beryllium above the RFETS site housekeeping level of 25 ug/ft^2 The sample results are documented in Table 1-1 of this report

3.3.3 Chemicals

The chemicals in Building 123 are associated with the operations currently within that facility. They are being tracked by the RFETS Chemical Tracking Group under the "Right-to-Know" provisions of SARA and are being managed by the laboratories. These chemicals will be removed at the time active laboratory operations cease Any chemicals remaining will be addressed by the RFETS Chemical Tracking Group which will utilize or lab-pack for disposal. The current inventory of the building includes nitric acid, hydrochloric acid, hydrofluoric acid, oxalic acid, ammonium hydroxide, formic acid, perchloric acid, toluene, isopropyl alcohol, DDCP, ammonium thiocyanate, methanol, mercury, lead, cadmium, beryllium, sodium hydroxide, and potassium permanganate

3.3.4 RCRA Hazardous Waste In SAAs

The Satellite Accumulation Areas (SAAs) contain RCRA hazardous waste that was generated by the operations within the room in which it is stored This waste will be characterized by "Process Knowledge" because the custodian is knowledgeable of all material that went into each SAA waste stream and has kept each waste segregated since generation These waste streams are further tracked by the Site's SAA tracking system and is audited internally. This waste must be properly packaged, labeled, and shipped for storage or disposal prior to closing the accumulation areas

Representative waste types for each area are summarized as follows

Room 103A - Combustibles, waste isopropanol, DDCP/toluene
Room 124 - Liquid waste methanol, isopropanol
Room 125 - DDCP/toluene, isopropanol contaminated with toluene
Room 127 - Hydrochloric acid, hydrofluoric acid, ethanol
Room 156 - Combustibles, waste toluene/DDCP, isopropanol

3.3.5 Perchloric Acid

Perchloric acid hoods (5) occupy four rooms (105, 112, 127 and 157(2)) within Building 123. Over the years, perchloric acid may have crystallized in the hoods The crystalline form may be shock sensitive and represents a potential physical hazard to the workers To mitigate this hazard, the hoods and duct work will be flushed and the rinsate directed to the Site waste water treatment plant

3.3.6 Pressurized Gas Cylinders and Liquid Nitrogen

Pressurized gas cylinders are used by the laboratories Removal of these cylinders prior to the decommissioning effort will be conducted by the laboratory personnel when they are relocated The liquid nitrogen system will also be disconnected and removed as part of this project by RFETS personnel when the utilities are disconnected

3.3.7 Polychlorinated Biphenyls (PCBs)

PCBs may have been utilized in the light ballasts Thus far, no other system has been identified in Building 123 with the potential of having PCBs present in the components. The light ballasts will be evaluated for PCBs once the building has been vacated and the lights are no longer needed Should the light ballasts contain regulated concentrations of PCBs the decommissioning contractor will be required to remove the ballasts They will be packaged and shipped by RMRS Waste Management

3.3.8 Radiological Contaminated Materials

Radiological assessments have been conducted in Building 123 by RFETS Radiological Operations. The following areas have Radiological Material Management Areas (RMMA) mostly in laboratory hoods: Rooms/Labs 103A, 105, 112, 124, 125, 156, 157, and 163. Radiological Contamination Areas (RCAs) are in Room/Labs 103A, 105, 112, 123, 124, 125, 126, 127, 135, 149, 155A, 156, 157, 158, 163. Radiological sources are kept in Rooms/Labs 123, 126, and 155A All of these areas are being managed for their radiological characteristics

3.3.9 Metals

Metals (specifically lead, chromium, cadmium, and arsenic) were sampled from selected painted surfaces in Building 123 for industrial hygiene purposes Site historical knowledge and the accredited inspector's knowledge were utilized in the sampling process Twenty-one samples were taken and analysis was conducted by Atomic Absorption Spectroscopy by a third independent party All paints indicated detectable levels of one or more of the metals Lead bricks and shielding are located through the radiological areas to lower the background and protect personnel. The largest volume of lead is used to shield detectors and sources This material will be removed by the source owners or dispositioned through the DCI Property Utilization and Disposition Department

Building 123 was used for R&D in support of nuclear weapons production Although a wide variety of activities were conducted in the building, large quantities of radioactive materials were not processed

Contamination is expected from Pu, U, and other materials processed in Building 123 laboratories In addition, a wide variety of chemicals were used for laboratory tests Many of these chemicals still remain in the building and are planned for removal through the deactivation process

Polychlorinated Biphenyls are also likely to be encountered in equipment and electrical devices Due to the age of the facility, considerable amounts of asbestos are present in the insulation and building materials Lead is also present in the glovebox shielding and in some of the building materials.

3.4 DESCRIPTION OF OPERATIONS

This section describes the research and development (R&D), and support operations which were previously conducted in Building 123 Because research operations were constantly changing during facility operations, only a general description of them is provided Operations are separated into 14 general areas of responsibility and are described below by room number

3.4.1 Room 158 Receiving Station

Room 158 functioned as the primary receiving point for radioactive and non-radioactive materials coming into Building 123 These materials are in the form of office supplies, building supplies, environmental samples, process area samples, laboratory reagents, electronic and dosimetry components and radioactive laboratory standards. This area has previously been used for storage of radioactive materials and LLW receptacles

3.4.2 Room 157 Sample Preparation Laboratory

Room 157 was the first environmental preparation laboratory Environmental waters, stack filters and ambient air samples are prepared. Radioactive spikes of 1 ml are added to samples in this room Filters are spiked and then burned within a furnace, then further dissolved in hyperchloric acid. Liquid samples and pre-electroplating solutions are taken to dryness by heating in the laboratory fume hoods Columns are then run to precipitate out the various radionuclides.

Room 157 is a double module containing six laboratory hoods for sample preparation. Four standard type hoods, one large process hood in the center of the room and a low-level fume hood for non-radiological work are present

3.4.3 Room 156 Sample Preparation Laboratory

The function of Room 156 is essentially the same as Room 157 Room 156 has a walk-in freezer for storage of routine bioassay samples Additional preparation of the pre-electroplating samples is accomplished within a fume hood

Historically, Room 156 was used for analysis of samples obtained during human autopsies Detailed smear and direct surveys performed in March 1991 and in June 1997 have indicated that no residual contamination exists

3.4.4 Room 163 Air Filter Counting Laboratory

Room 163 serves as the filter counting facility Radiological Control Technicians (RCTs) count smears, swipes, and leak test samples in this room as well Because of the possible activity of some air filter samples, self-monitoring is required prior to exiting the room An Alpha Met survey instrument is located at the door for this purpose

3.4.5 Room 155A TLD Irradiator Room

Room 155A houses the TLD irradiator used by the External Dosimetry program The irradiator houses a 2 Curie Cesium 137 sealed source Cs-137/Ba-137m is both a gamma emitter (0 662 MeV 85 percent yield) and a beta emitter (0 514 MeV Max) TLDs are loaded into an automatic sample changer which exposes them to the Cesium source sequentially The exposure mechanism is automatic and the source does not leave the shielding under normal operating conditions Room 155A is controlled for external gamma exposure only The contact exposure rate on the TLD irradiator during operation is a maximum of 0 4 mR/hr

3.4.6 Room 103A Special Bioassay Laboratory

Room 103A is the special bioassay lab These bioassay samples are presumed to be radioactive because of the nature of the investigation Pre-electroplating processes like those described for Rooms 156 and 157 take place here

3.4.7 Room 105 Chemistry Development Laboratory

Room 105 is the research and development laboratory and the spike preparation room Laboratory standardized solutions are stored in bulk within a locked safe Some pre-electroplating preparation work is also done here.

3.4.8 Room 112 Special Environmental Laboratory

Room 112 is the special environmental laboratory All soil work is done here as well as overflow from the other environmental labs Room 112 is a secondary storage area for bioassay samples Bioassay samples are stored in the laboratory freezer in Room 112 when the walk-in freezer in Room 165 is full

Historically, Room 112 was used in dog autopsy studies. Detailed radiological surveys performed in 1991 and in June 1997 indicated that no residual contamination exists

3.4.9 Room 123 Calibration Sources

Room 123 is used by Radiological Instrumentation for the storage of calibration sources for survey meter repair, calibration and performance checks

3.4.10 Rooms 124 and 127

Rooms 124 and 127 are currently used as the electroplating facility Final stages of electroplating preparation are performed on the bench top Electro-disposition of all samples is then performed in the fume hood, fixing the sample residual to a small metal disk approximately the size of a dime The average activity per electroplated sample planchet ranges from 5-10 dpm

3.4.11 Room 125 Bioassay Laboratory

Room 125 functions as the standard bioassay preparation area. It is also used for tritium distillations Tritium distillations are performed in a sealed distillation system apparatus Routine urine and fecal samples are submitted to the Room 158 receiving station for analysis. Fecal samples are transferred to the walk-in freezer in Room 156 Volume reduction and purification of routine urine and fecal samples is performed in the hoods in Room 125 One ml of spike solution is added and Pu is extracted by ionic exchange The extraction product is transferred in small volume covered beakers to Rooms 124 or 127 for electroplating

3.4.12 Room 126 Gas Chromatography

Room 126 is designated as the nuclear spectroscopy room Gas chromatography is the only radiological concern Two gas chromatographs within the room use electron capture detectors containing Ni-63. The detectors are sealed making the material inaccessible No other radioactive material is used within the room

3.4.13 Room 135 Alpha Spectroscopy and Liquid Scintillation Counting

Room 135 is used for alpha spectroscopy and liquid scintillation counting. About 95-100 samples are processed weekly in Room 135 This includes routine count and special bioassay screening Planchets produced in Room 124 are counted in Room 135, as are some samples prepared in Rooms 157,156,125, 103A, and 112 In addition, numerous planchets are kept in storage bins for reference purposes

3.4.14 Room 149 Gamma Spectroscopy

Room 149 is used for gamma spectroscopy and all samples are multiple bagged or contained in rigid containers Some calibration and check sources are stored in file cabinets in this room

4.0 RADIOACTIVE AND HAZARDOUS CHARACTERISTICS

Location-specific information concerning the characterization of each area of the B123 Cluster and each room in Building 123 is presented in this section This localized characterization includes descriptions of specific events, operations, installations, construction, equipment operation, and other process knowledge information relating to the 123 Cluster. The information collected in this section has been obtained from several sources, including past/current records and interviews with RFETS personnel which had relevant 123 Cluster work experience or related knowledge. A complete listing of the information sources examined for this report is provided in Section 5.0.

The inventory of radioactive materials within Building 123 are limited In the radiation instrument calibration Room 123, various types of sources similar to other cold area calibration shops are used All sources except tritium gas are of the electroplated or sealed source type. The lab rooms have liquid process waste sinks and piping which receive any unusable low level waste liquids, but there are no other systems in these labs considered to be potentially internally contaminated Extensive surveys were performed of the laboratory fume hood interior surfaces, both alpha and beta smear and direct surveys in 1991 and again in June 1997 Internal surveys of the hoods were below detection limits and consequently the hoods are considered to be uncontaminated, and primarily function for industrial hygiene purposes rather than for radiological purposes

Radioactive spike solutions were used as an additive during the preparation of most samples The concentrations of the radioactive spike solutions used as a quality control mechanism in sample preparation are very low, with a maximum reported level of 10 dpm/ml The diluted spike solutions were mixed from more concentrated solutions inside the Chemistry Development Room 105 Radiological contamination surveys conducted in June 1997 revealed elevated levels of fixed beta/gamma contamination (124,000 dpm) in the room around the sink and floor areas. It is suspected that the elevated areas may have resulted from a spill of concentrated spike material used in this room

Actinide elements, compounds, sources and other radioactive materials historically used and stored include the following isotopes and other associated trace isotopes or radioactive decay products

- Am-241
- Cs-137
- Sr-90
- Tritium
- H-3
- U-234
  U-235
  U-236
  U-238
- Ba-133
- Cf-250
- Gd-148
- Ni-63
- Cm-244
- Pb-210
- Pu-238
  Pu-239
  Pu-240
  Pu-241
  Pu-242

4.1 FACILITY WORK AREAS

Building 123 has been divided into work areas for the purpose of deactivation and decommissioning The areas are as follows

Area 1 - East and North Wing (Rooms 100-135), constructed in 1952

Area 2 - Addition to East Wing (Rooms 139-151), constructed in 1968

Area 3 - West Wing (Rooms 154-163), constructed in 1972

Area 4 - Addition to East Wing (Room 165), constructed in 1974

Building 114 - Bus Station

Building 113 - Guard shack/ Medical records storage

Building 123S - Metal storage shack

Exposure assessments of the hazards that may be encountered during specific decommissioning activities is discussed in the Building 123 Project HASP Information contained in the Building 123 HASP and this document will be incorporated into the planning process of each activity (via Activity Hazard Analysis evaluations) to ensure maximum protection of the worker

4.2 FACILITY CHARACTERIZATION

The following chart (Appendix A) is organized by decommissioning areas described above and includes a description of the operation and process information available for each room and area, the materials that were used in the room based on historical information, the contamination considerations for each room, and the confirmation analysis which was performed prior to and during decommissioning activities Additional characterization information will be obtained using the decommissioning characterization protocols. The types and volumes of wastes generated during the Building 123 decommissioning is discussed in the Building 123 project Waste Management Plan.

4.3 QUALITY ASSURANCE PROGRAM

The Quality Assurance Program for characterization activities follows the same program established for management of hazardous wastes onsite and meets the minimum requirements established by "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U. S Environmental Protection Agency, SW-846, 1986, Third Edition Quality Assurance (QA)/Quality Control (QC) procedures addressing waste characterization are maintained at the site.

4.3.1 Waste Management

The requirements for characterization of hazardous waste is specified in several waste management procedures that are based on the requirements established primarily by 40 CFR 261 and 6 CCR 1007-3, 261 If the waste materials tested demonstrate hazardous or radioactive characteristics, then they will be managed in accordance with the Low-Level or Hazardous Waste Requirements Manual A more thorough discussion of the project's waste management is in the Building 123 project Waste Management Plan (Doc No RF/RMRS-97-029)

4.3.2 Health and Safety/Industrial Hygiene

All decommissioning activities are reviewed in the context of potential exposure of workers to hazards within the facility Exposure assessments are discussed in the Building 123 project HASP

5.0 INFORMATION SOURCES

The preparation of this report involved the retrieval, from various sources, and review of several documentation files pertaining to the building and past operations therein. The following sections list the files that have been reviewed in the course of this reconnaissance characterization

This investigation effort also included the collection of first-hand process knowledge interviews from RFETS employees with Building 123 experience A listing of personnel who contributed first-hand information is available in the project files

5.1 FACILITY RECORDS

The following building records are available for retrieval from the Building 123 Decommissioning Project Document Files.

5 1 1 Building 123 Routine Radiological Monitoring Contamination Survey Reports, dated January 1990 through present

5 1 4 Building 123 Waste Stream and Residue Identification and Characterization (WSRIC)

5.2 FACILITIES ENGINEERING RECORDS

5.2.1 Basic Information for the Decommissioning of Building 123

5 2 2 Facilities Engineering Drawings of Building 123

5 2 3 Facilities photographs from walkdowns conducted April 1997

5.3 FIRST-HAND PROCESS KNOWLEDGE INFORMATION

5 3 1 RFETS staff members previously/currently assigned to/or associated with Building 123

Process information on operations within the Building 123 was obtained from various individuals associated with the project. A complete listing of persons contacted during the building characterization is available in the project files.

6.4 REFERENCES

Building 123 Radiological Monitoring Contamination Survey Reports, dated January 1990 and June 1997

Basic Information for the Decommissioning of Building 123

Facilities Engineering Drawings of Building 123

Facilities photographs from walkdowns conducted in April 1997

U S Department of Energy 1992 Phase I RFI/RI Work Plan for Operable Unit 13, 100 Area

U S Department of Energy 1995 Phase I RFI/RI Work Plan for Operable Unit 13, 100 Area, Data Summary No 2

U S Department of Energy 1995 Phase I RFI/RI Work Plan for Operable Unit 9, Original Process Waste Lines

U. S Department of Energy 1995 Phase I RFI/RI Work Plan for Operable Unit 9, Outside Tanks

K-H, 1997, Decommissioning Program Plan, (DRAFT)

DOE, 1996, RFETS Ten Year Plan

RMRS, 1997, Building 123 Reconnaissance Level Characterization Report, May 1997

EPA, 1994, Guidance for the Data Quality Objective Process, EPA, QA/G-4

Draft NRC NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination"

RMRS, 1997, Building 123 Decommissioning Project Health and Safety Plan, Rev 0

RMRS, 1997, Building 123 Decommissioning Project Waste Management Plan, Rev 0

RMRS, 1996, Low Level Waste Management Plan 44-RWP /EWQA - 0014, Rev 1

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, CO

DOE, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, CO

K-H, June 1996, Rocky Flats Environmental Technology Site Radiological Control Manual,

DOE, Waste Stream and Residue Identification and Characterization for Building 123

K-H, 1997, Decommissioning Program Plan, (DRAFT)

DOE, 1996, RFETS Ten Year Plan

EPA, 1994, Guidance for the Data Quality Objective Process, EPA, QA/G-4

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RMRS, 1997, Building 123 Decommissioning Project Health and Safety Plan, Rev 0

RMRS, 1997, Building 123 Decommissioning Project Waste Management Plan, Rev 0

RMRS, 1996, Low Level Waste Management Plan 44-RWP /EWQA - 0014, Rev 1

DOE, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, CO

K-H, June 1996, Rocky Flats Environmental Technology Site Radiological Control Manual

DOE, Waste Stream and Residue Identification and Characterization for Building 123

APPENDIX A

BUILDING 123 CHARACTERIZATION

ROOM NUMBER	PROCESS INFORMATION	RADIOACTIVE AND/OR HAZARDOUS & ACM MATERIALS USED	SURVEYS/SAMPLES CONDUCTED
100	WEST ENTRY	Cementitious "Transite' wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
101	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
101A	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
102	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
102A	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
103	REAGENT LAB	Cementitious wall board, floor tile, pipe insulation, RCRA Check pts	Asbestos PLM Test 10% RAD Survey, Be Smears, Pb paint
103A	SPECIAL BIOASSAY	Same as above, RCA/RMMA, isopropanol, DDCP, TOluene, RCRA area	Asbestos PLM Test 100% RAD Survey & Acids Be Smears
105	SPIKE AND ELECTROPLATING PREP	Cementitious walls, floor, pipe, RCRA/RMMA, Perchloric Acid Hood Nitric acid, RCRA Check Pt	Asbestos PLM Test 100 RAD Survey & Acids
106	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
107	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey, Be Smears
107A	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
107B	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
109	OFFICE AREA	Cementitious floor tile, walls, Possible CS 137 Spill	Asbestos PLM Test 10% RAD Survey, Be Smears
109A	STORAGE	Cementitious floor tile, walls, Possible CS 137 Spill	Asbestos PLM Test 100 RAD Survey, Be Smears
109B	STORAGE	Cementitious floor tile, walls, Possible CS 137 Spill	Asbestos PLM Test 100% RAD Survey
109C	STORAGE	Cementitious floor tile, walls, RCA/RMMA	Asbestos PLM Test 100% RAD Survey
111	BERYLLIUM AND BACTERIOLOGY	Cement walls, pipe insulation, Beryllium RCRA cabinets ACIDS	Asbestos PLM Test 100% RAD Survey Be Smears ACIDS

ROOM NUMBER	PROCESS INFORMATION	RADIOACTIVE AND/OR HAZARDOUS & ACM MATERIALS USED	SURVEYS/SAMPLES CONDUCTED
112	ENVIRONMENTAL SOIL LAB	RCA/RMMA Cement walls, pipe insulation, Beryllium RCRA Area RAD drums	Asbestos PLM Test 100% RAD Survey Be Smears
113	MEN'S RESTROOM	Pipe insulation	Asbestos PLM Test 10% RAD Survey, Pb Paint
113A	JANITOR'S STORAGE ROOM	Pipe insulation	Asbestos PLM Test 10% RAD Survey
113B	MEN'S LOCKER ROOM	Pipe insulation	Asbestos PLM Test 10% RAD Survey, Pb Paint
121	HALLWAY NEAR 103 & 133	Pipe insulation, Cementitious walls	Asbestos PLM Test 10% RAD Survey, Be Smears
121A	OFFICE AREA	NONE	Asbestos PLM Test 10% RAD Survey
122	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey, Be Smears
123	HPI LAB CONTAINS RAD SOURCES	Same as above, previous RCA/RMMA	Asbestos PLM Test 10% RAD Survey
123A	HALL TO EXIT LOCKERS	Pipe insulation	Asbestos PLM Test 100% RAD Survey, Be Smears
124	ELECTROPLATING LAB	Cementitious walls, pipe insulation, floor tiles, methanol, isopropanol, RCRA Area	Asbestos PLM Test 100% RAD Survey
125	RADIOACTIVE SPIKES, TRITIUM DISTILLATIONS, BIOASSAY FOR URINE	Cement walls, cabinet and hood, pipe insulation, DDCP, toluene, isopropanol, Acids/bases	Asbestos PLM Test 100% RAD Survey Acids, Pb Paint
126	GAS CHROMATOGRAPH (CONTAINS NI-63 SOURCE)	RCA, Cement walls, floor tile, pipe insulation, Nitrogen Dewar	Asbestos PLM Test 100% RAD Survey
126A	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey, Be Smears
126B	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
126C	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
127	BIOASSAY/URINE	RCA/RMMA, HCL, HF, TICL3, Ethanol, Acids	Asbestos PLM Test 100% RAD Survey Acids
128	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
128A	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
129	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey

ROOM NUMBER	PROCESS INFORMATION	RADIOACTIVE AND/OR HAZARDOUS & ACM MATERIALS USED	SURVEYS/SAMPLES CONDUCTED
131	ELECTRONICS LAB	RAD Sources Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 100% RAD Survey, Be Smears
131C	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey, Pb Paint
132	EAST UTILITY ROOM	Cementitious walls	Asbestos PLM Test 10% RAD Survey, Be Smears
133	EXTERNAL DOSIMETRY	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
133A	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
133B	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
133C	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
135	ALPHA SPEC AND LIQUID SCINT LAB	RCA RAD Sealed Sources, Tritium & C-14	Asbestos PLM Test 100% RAD Survey
137	SMALL ROOM AT TRUCK DOCK	Gas cylinder storage	Asbestos PLM Test 10% RAD Survey
138	OFFICE AREA	Gas cylinder storage	Asbestos PLM Test 10% RAD Survey
139	SE ENTRY AIRLOCK	Floor tile	Asbestos PLM Test 10% RAD Survey
140	HALLWAY NEAR 140A	Floor tile, pipe insulation	Asbestos PLM Test 10% RAD Survey
140A	OFFICE AREA	Floor tile	Asbestos PLM Test 10% RAD Survey, Pb Paint
141	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey
142	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey
143	OFFICE AREA	Floor tile	Asbestos PLM Test 10% RAD Survey
143A	OFFICE AREA	Floor tile	Asbestos PLM Test 10% RAD Survey
144	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey
146	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey

ROOM NUMBER	PROCESS INFORMATION	RADIOACTIVE AND/OR HAZARDOUS & ACM MATERIALS USED	SURVEYS/SAMPLES CONDUCTED
147	OFFICE AREA	RCA, Sealed Source, lead bricks, drywall joint compound, floor tile	Asbestos PLM Test 100% RAD Survey
150	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey, Pb Paint
151	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey
154	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey
155	OFFICE AREA	Nitrogen Dewars, drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey, Be Smears, Pb Paint
155A	TLD IRRADIATOR/CONTAINS A SEALED GAMMA SOURCE W/IN A SHIELDED IRRADIATOR	RCA, Sealed Sources	Asbestos PLM Test. 100% RAD Survey
156	USE OF RADIOACTIVE SPIKES, BIOASSAY, ROUTINE FECAL	RCA/RMMA, Toluene, DDCP, isopropanol, acids, bases	Asbestos PLM Test 100% RAD Survey, acids
157	ENVIR SAMPLE PREP LAB, USE OF RADIOACTIVE SPIKES, STACK AIR, AMBIENT AIR, SURFACE WATER SAMPLES	RCA RCRA Area/Rad drums	Asbestos PLM Test 100% RAD Survey, Be Smears, Pb Paint
158	SAMPLE RECEIVING STATION	RCA	Asbestos PLM Test 100% RAD Survey, Be Smears, Pb Paint
159	WEST UTILITY ROOM	Drywall joint compound	Asbestos PLM Test 10% RAD Survey, Be Smears
160	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey
161	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey, Pb Paint
162	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey
162A	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey
162B	OFFICE AREA	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey, Be Smears
163	AIR SAMPLE COUNTING ROOM	RCA/RMMA	Asbestos PLM Test 100% RAD Survey, Be Smears

ROOM NUMBER	PROCESS INFORMATION	RADIOACTIVE AND/OR HAZARDOUS & ACM MATERIALS USED	SURVEYS/SAMPLES CONDUCTED
164	HALLWAY IN FRONT OF 163	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey
165	COMPUTER ROOM (SE CORNER)	Drywall joint compound, floor tile	Asbestos PLM Test 10% RAD Survey, Pb Paint